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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/018,717	12/18/2001	Hisashi Kajiura	113184-034	4953
29175	7590	06/09/2004	EXAMINER	
BELL, BOYD & LLOYD, LLC			VERSTEEG, STEVEN H	
P. O. BOX 1135			ART UNIT	
CHICAGO, IL 60690-1135			PAPER NUMBER	

1753

DATE MAILED: 06/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/018,717

Applicant(s)

KAJIURA ET AL.

Examiner

Steven H VerSteeg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 December 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 27-52 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 27-31, 36, 38-44, 46, 48, 49, 51 and 52 is/are rejected.
- 7) ☒ Claim(s) 32-35, 37, 45, 47 and 50 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/18/01.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Information Disclosure Statement***

2. The reference crossed out has not been received. There is a page of chemical abstracts that have been received, but not cited. Please re-submit the cited reference and I will consider it before the next office action.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 27-29, 36, 40-44, and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 94/04461 to Withers et al. (Withers).
5. For claim 27, Applicant requires a method for producing fullerene comprising the steps of providing a pair of carbon-based electrodes spaced apart to define a region there between; generating an arc discharge between the pair of carbon-based electrodes; and supplying a gas containing carbon to the region between the electrodes.

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6. For claim 40, Applicant requires a device for producing fullerene comprising a pair of carbon rod electrodes; and a gas supply mechanism capable of continuously supplying gas containing carbon to a region spaced between the pair of carbon rod electrodes.

7. Withers discloses a method (claim 1) and apparatus (claim 46) for producing fullerenes. The apparatus comprises a pair of carbon electrodes **101a, b**; and a gas supply for continuously supplying carbon to a region between the electrodes (Figure 13a). In the method an arc discharge is generated between the electrodes (example 1).

8. For claim 28, Applicant requires the gas containing carbon to be continuously supplied to the region between the electrodes. The gas is supplied continuously (pg. 21, l. 16-21).

9. For claim 29, Applicant requires the gas to be a hydrocarbon. Withers discloses the gas to be a hydrocarbon (pg. 23, l. 26).

10. For claim 36, Applicant requires an inert gas to be supplied. Withers supplies an inert gas (pg. 9, l. 22-29).

11. For claim 41, Applicant requires a through hole in the electrode for feeding the hydrocarbon. Withers discloses the limitation (pg. 24, l. 4-11).

12. For claim 42, Applicant requires a pipe having a nozzle in juxtaposition to the region between the pair of electrodes. Withers discloses the limitation (Figure 13a).

13. For claim 43, Applicant requires a carbon gas supply. For claim 44, Applicant requires the supply to be a hydrocarbon supply. As noted above, there is a hydrocarbon supply (Figure 13a).

14. For claim 46, Applicant requires an inert gas supply. As noted above, there is an inert gas supply.

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 30, 31, 38, 39, 48, 49, 51, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/04461 to Withers et al. (Withers) in view of *Catalytic Synthesis of Single-Layer Carbon Nanotubes with a Wide Range of Diameters* by Kiang et al. (Kiang).

17. For claims 30 and 48, Applicant requires supplying methane. For claims 31 and 49, Applicant requires supplying sulfur. For claims 38 and 51, Applicant requires an anode that includes a catalyst. For claims 39 and 52, Applicant requires the catalyst to be a certain metal.

18. Withers is described above, but does not disclose the gas to be methane, the use of sulfur, or a catalyst coated anode. Withers does, however, indicate that the hydrocarbon can be any hydrocarbon (pg. 22, l. 22-25).

19. Kiang discloses that in making fullerene nanotubes, it is beneficial to utilize a catalyst coated anode such as Co in an atmosphere containing hydrocarbon such as methane with a sulfur gas because it produces nanotubes with 1-6 nm diameter (pg. 6612).

20. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Withers to utilize methane as the hydrocarbon gas, utilize sulfur, and an anode containing Co because of the desire to control the fullerene nanotubes to be 1-6 nm in diameter.

***Allowable Subject Matter***

21. Claims 32-35, 37, 45, 47, and 50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. The following is a statement of reasons for the indication of allowable subject matter: it is neither anticipated nor obvious to one of ordinary skill in the art at the time the invention was made to have a method for producing fullerene as claimed by Applicant in claims 32, 33, 35, and 37 or a device for producing fullerene as claimed by Applicant in claims 45, 47, and 50.

23. Neither Withers nor Kiang discloses introducing hydrogen sulfide, hydrogen gas, or passing the carbon gas through thiophene. Modifying either reference to provide such limitations would require hindsight.

***General Information***

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (571) 272-1700.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Denis Boyd at (571) 272-0992.


For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (571) 272-1300.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H VerSteeg whose telephone number is (571) 272-1348. The examiner can normally be reached on Mon - Thurs (6:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Steven H VerSteeg  
Primary Examiner  
Art Unit 1753

shv  
June 3, 2004